NINETEENTH CENTURY ROADS-
FRONTIER AND ANTEBELLUM ROAD BUILDING AND THE TURNPIKE MOVEMENT

The "Turnpike Era" is generally considered to be from the 1790's to the 1850's. It was inspired by the Lancaster Turnpike (from Philadelphia to Lancaster, Pennsylvania, completed in 1794) and also included the plank road era. The movement sprang from the poor condition of the country roads in the late eighteenth and early nineteenth centuries, the revealed need for overland transportation during the War of 1812, and the failure of federal and state efforts to meet this need.

George Rogers Taylor in The Transportation Revolution, 1815-1860 commented on the extremely poor condition of country roads in the era and concluded that the reasons they were so poorly maintained were: 1) the sprawling rural communities did not have the capital or the labor for improving the tremendous network of roads in the period; 2) the Anglo-Saxon tradition that road building was a community responsibility prevailed; and 3) farmers did not think that repairing roads was a wise use of their time or money. In the South, where the country roads were in the poorest condition, the planters were well aware of the inconvenience of bad roads. But they also knew the roads were worst in the off-season when the draft animals and slaves were not busy in normal plantation duties. In essence, they would rather be delayed a couple of days getting their staples to market when time was not of great significance than systematically maintain the roads year around.

Following the War of 1812, there was enthusiasm for improved roads for several reasons. Bad roads had made it difficult the moving of troops during the war. The British blockade of the

coast compelled an unprecedented use of the roads, emphasizing their unsatisfactory condition and the need for an effective alternative to water transportation, especially in times of war. Other factors contributing to this enthusiasm were the post-war need of farmers to get their war-accumulated surpluses to markets and the manufacturers' desire to increase their markets and sell their products in the interior.

Unfortunately federal aid for good roads was inconsistently allocated and, after 1830, debated rather than acted upon. Federal roads had been built in the lower South prior to the War of 1812 for postal and military purposes. The Cumberland or National Road was federal aid effort, but post-war programs were limited by Presidential vetoes of road measures by James Madison in 1817, James Monroe in 1822, and Andrew Jackson in 1830. The debates which followed focused on the constitutional provision "to establish Post Offices and Post Roads." Did this mean the federal government would merely plan and designate post roads (as they were then doing) or did it also authorized Congress to build, operate, and repair them? As in other constitutional conflicts in history, the issue was ultimately decided by the popular will, i.e., then enough people wanted a reform, it became "constitutional." Regardless of the lack of systematic federal aid for road building, there was an increase in internal improvements appropriations in every administration from Jefferson to Jackson. Ironically, John Quincy Adams, the great champion of internal improvements, had $702,000 annual appropriations and Andrew Jackson (who vetoed the Maysville Road Bill) had $1,323,000.

Also ironical was the fact that the South, which needed road improvement the most and could be expected to receive more Federal aid than other areas of the country, opposed Federal aid for roads. Many Southerners believed such aid would benefit other areas of the United States

more than the South, that expenditures for road improvements would increase the need for revenue, and, at the same time, would increase the likelihood of a higher tariff "for revenue purposes." They also did not like the idea of interpreting the Constitution broadly on this issue for fear it would be liberally interpreted on the other issues not so favorable to the South.

The federal-aid-for-roads effort was also weakened by some states withdrawing their support. Those states who initially favored Federal aid (New York and Pennsylvania for example), when they were not successful, began to effect improved roads at state expense, they were less enthusiastic towards being taxed to support roads in other areas of the country. Add it all together, and the result was little Federal aid during this period.

With the federal government out of the road business and most state governments being reluctant to "take up the slack," the road building that was done had to be by private individuals and companies. The result was the turnpike (toll road) movement - roads built by companies who sold stock to people along the route and others who would benefit from the road being built.

Most turnpikes were privately owned, but some received state aid, particularly in the South. To induce subscriptions, chartered companies were protected against direct competition. The toll rates were sometimes fixed by statue but generally left to the discretion of the directors. In most instances a company took over the improvement and maintenance of an existing highway, but, in laying out a new one, it received the right of eminent domain in buying land. New York and Pennsylvania took the lead in turnpike building. When the first turnpike company was chartered in 1792 to build sixty-two mile highway form Philadelphia to Lancaster, it immediately oversubscribed its stock. Within two years it completed the road, at seventy-five hundred dollars a mile. This was the first macadamized road in the U.S., and was declared to be a "masterpiece of

its kind ... paved with stone the whole way and overland with gravel, so that it is never obstructed during the most severe season." Pennsylvania road builders invested six million dollars in turnpikes by 1822. In New England private road builders invested six and a half million dollars by 1840. Southern states often gave public aid to turnpikes in this era with Kentucky putting almost two and a half million dollars into bridges, turnpikes, and plank roads by 1838 and Virginia investing five million by 1861. Local governmental units were not generally major financiers of roads, but Ohio local governments spent two million dollars on turnpikes in the era.

Taylor alleges that the turnpike movement failed because: 1) the tolls were too high for users who had long freight hauls; 2) under the heavy traffic conditions, the cost of keeping the roads in good repair was too high: 3) collection of tolls involved burdensome operating expenses, and it was very difficult to secure honest and efficient tollkeepers (Dishonesty was so common that in some vicinities they actually sold the right to operate tollgates.); and 4) the public avoided the tollgates when possible through "shunpikes" (going around the tollgates) or by waiting until the tollgates closed at night. Perhaps the competition of canals and railroads also played a part in the decline of the movement, but, in most cases, the turnpikes failed before canal or railroad transportation had developed enough to be competitive. Nevertheless, turnpikes reduced the cost of overland transportation by nearly fifty percent. Their success, then, cannot be measured simply by the increase of receipts over expenditures. Henry Clay, speaking before Congress in favor of internal improvements, once said,

> "I think it very possible that the capitalist who should invest his money, in one of those objects, might not be reimbursed eight per cent annually upon it. And yet society, I various forms, might actually reap fifteen or twenty per cent. The benefit resulting from a turnpike road, made by private associations, is divided between the capitalist who receives his tolls, the lands through which it passes, and which are augmented in value, and the commodities whose value is enhanced by the diminished expense of

transportation."

This is perhaps a more accurate reflection of return on investment by the turnpikes for the nation.

In any case, turnpikes were a major part of the land transportation history of the early nineteenth century in the United States and in Alabama. In Alabama, turnpikes existed along with public roads and country roads. The state or federal government maintained the public roads. Alabama followed the Anglo-Saxon tradition of having persons along the road do the maintenance. All able bodied men between the ages of eighteen and forty-five had to work on the public roads ten days a year, furnish mules for road work, or pay ten dollars. Communities or individuals maintained the country roads.

Although most roads were not much more than the frontier roads - cleared of stumps by poorly drained and poorly maintained - there were at least three kinds of roads which offered an improvement to the traditional condition of travel: "corduroy" roads, shell roads, and plank roads. Corduroy roads were often constructed over soft swampy ground which was kept moist by springs and could not by cheaply drained. They consisted of rows of roughly uniform and straight saplings placed across the road with the dirt spaces between them packed as hard as possible. Shell roads, used mainly along the coast, were usually no more than oyster shells placed over the ordinary road, but they did expedite traffic in areas where the materials were locally available. The shell road that extended for six miles from New Orleans to Carrollton on Lake Pochartreain, for example, was for years the only good road out of the city. Magnolia Grove Avenue in Mobile was also a shell road at one time.

A third road of innovative construction was the plank. Railroads connected major

urban centers but did not answer the farm to market needs of the farmers. Plank roads seemed to fulfill such a need. William Gregg, the antebellum textile tycoon, in his Essay on Plank Roads, (Charleston, 1851), noted, "good common roads tend to change the condition of the farmer wherever they are extended; the plank-road gives him a thoroughfare infinitely superior to any other, not excepting the railroad." W. M. Gillespie, in A Manual of the Principles and Practice of Road making, (New York,), described the method of constructing these "Farmers' Railroads." Two parallel rows of small sticks of timber (called indifferently "sleepers," "stringers," or "sills") were embedded in the road, three or four feet apart. Planks, eight feet long, and three or four inches thick, were laid upon these sticks, across them, at right angles to their direction. A side track of earth, to turn out upon, was carefully graded. Deep ditches were dug at east side to ensure perfect drainage and thus was formed a plank road.

The idea of using lumber to surface roads had originated in Russia, but by 1846 the first plank road in the United States was built between Syracuse and Central Square, New York. Alabama Governor H. W. Collier (1849-1853) was one of the early converts to the plank road movement, and within two years plank roads were chartered in Alabama. He was impressed by their cheapness and ease of construction (compared to macadamized roads) and thought they were the best bet to connect the plantations with the towns. Some local engineers supported the Governor with statistics that alleged that plank roads were not only cheaper to build than railroads, but were easier to maintain and, with relays of horses, could haul goods more cheaply and almost as quickly. They saw an additional advantage over railroads in that the plank roa[illegible]ad was the entire investment whereas railroads had to invest in locomotives, rolling stock, depots, repair shops, machinery, and numerous employees - all of which, in the case of plank roads, were

furnished by The road user.

The heyday of plank roads in Alabama was the mid-nineteenth century, extending from the first plank road chartered by the legislature in 1848 to decline of the movement and their abandonment as toll roads by 1857. Approximately 150 miles of plank roads were built in this 1848-1857 period. The "Crane Brake Plank Road" was chartered to be built between Demopolis and Uniontown on March 4, 1848, and thirty-four more plank-paved roads were chartered by the legislature by 1854. However, not all of the roads chartered were actually completed. Two completed roads were The Montgomery South Plank Road and the Central Plank Road, described by Peter A. Brannon, Director of the Alabama Archives form 1955 to 1967, in a series of articles published in the Montgomery Advertiser and the Alabama Highways magazine in the 1930's.

The Montgomery South Plank Road (also called the "South Plank" or "Mobile Plank" road) was chartered in 1850 to run thirty miles due south towards Mobile, with branches to be constructed to Orion in Pike County and Greenville in Butler County. The road, as planned, would have been about the same route as the later Snowdoun highway, crossing Catoma Creek at or near Norman Bridge. The plank road, as built, stretched seventeen miles to the southwest, ending at Steep Creek. It crossed Catoma Creek near the L&N Railroad Bridge of later years, and Pintlala Creek east of the old covered bridge on the Warsden Road to Hayneville.

The road was originally incorporated by Joseph Hopper, John Figh, Thomas Burton, Hugh Henry, Matthew Stokes, Henry Holman, John Goldthwaite, John Hughes and William Vandiver. Capital stock of the Montgomery South Plank Road was $100,000 in shares of $100 each. Toll gates were required every three miles, and tolls charged for passage included: 2 ½ cents per mile for carriages; 3 ½ cents per mile for two horse pleasure carriages; 1 1/4 cents for one-animal

loaded carts; 3 cents for two-animal loaded wagons; 2 ½ cents for "neat cattle" (five head of cattle driven together); and 2 ½ cents for ten head of hogs. The company was declared organized when $25,000 of the capital was subscribed.

Unfortunately, the rich prairie country required $2000 to $4000 per mile to construct plank roads, rather than the anticipated $1200 to $1500 per mile, and the original incorporators were broke before enough mileage could be completed for the tolls to bring in any revenue. The project was mortgaged to the city of Montgomery in 1852, two years after incorporation of the orad company, for $30,000 in city bonds. In 1855 the city sold the road at public auction, due to nonpayment of interest, for $3500. The purchasers were Thomas H. Watts, Jefferson F. Jackson, and William J. Bibb.

The Central Plank Road was one of the two dozen toll roads chartered by the legislature during the 1849-1850 session. It absorbed the Montgomery and Wetumpka Plank Road chartered earlier and, as finally constituted, was to connect "the waters of Mobile Bay and the Coosa River at Wetumpka, and the Tennessee River." The incorporators were Montgomery and Wetumpka businessmen, and they selected Joseph G. Winter of Montgomery as President and William T. Hatchett of Wetumpka as Secretary.

Prior to moving to Montgomery, President Winter had been a prosperous merchant at Augusta, a successful banker at St. Mary's in Columbus, and an organizer of cotton and paper mills, including the Rock Island Paper Mills on the Chattahoochee River north of Columbus. In Montgomery his largest paying investment was the Winter Iron Works. Winter's son, Joseph S. Winter - a Montgomery lawyer - was the inspiration for Winter's investment and the chief promoter of the Central Plank Road project.

The Road was projected from Montgomery to Guntersville via Talladega, but the northernmost point in actual use was Wintervoro (12 miles southwest of Talladega and 60 miles north of Wetumpka). From Montgomery to Wetumpka the road followed the route later followed by the "Upper Wetumpka Road." North of Wetumpka the road went through Santuck, Central Institute (a Baptist school for which the road was named), Equality, Nixburg, Goodwater and almost to old Jumper's Spring. It crossed the Tallapoosa River at Judkins' Ferry.

The toll rates per mile on the Central Plank Road were: 2 ½ cents for one-horse private pleasure carriages; 3 ½ cents for each two-horse carriage; and 3 cents for loaded wagons drawn by two animals (if drawn by more than two animals, there was a 1 ½ cent charge for each extra animal). The charter called for a toll bridge over the Tallapoosa River at Judkins' Ferry, but the bridge may have never been built. Elmore County tradition, as reported by Brannon in 1931, maintained that the bridge was built but washed away in a few weeks. In any case, the chartered toll rates for the bridge were: 50 cents for each four-wheeled pleasure carriage, mail coach, or four-horse wagon; 25 cents for a two-horse wagon or an ox cart; 25 cents for each "buggy sulky;" and 10 cents for a man and a horse.

The Central Plank Road proved to be an even bigger failure that the "Mobile Plank." President Winter was said to have lost close to a million dollars. The reasons for failure were many. The Central Plank Road, like the Mobile Plank Road, cost $2000 to $4000 per mile to construct in contrast to the $1200 to $1500 anticipated construction costs. The high tolls and numerous exemptions limited receipts. Persons going to a funeral, to religious services, to vote, to have corn ground at the mill, to the blacksmith shop, to the doctor, or to military musters were

exempt form tolls. Also exempt were people living on the road who traveled less than three miles anyone walking on the road. The alternative of using water transportation also limited traffic on the Central Plank. A Wetumpka diary of April, 1852 recorded that flatboats passed that place at the rate of two or three per day, and , in the six months between the fall of 1851 and the spring of 1852, there was an average of about twenty-five steamboats a month. During Christmas week, 1851, the Magyar, Pearl, Ruby, Heroine, Georgia, Southern Belt and Louise steamboats picked up cotton at Wetumpka

The smooth wooden surface did improve the speed of travel, but the Central Plank problems may well summarize the reasons for the failure of the plank road movement. Construction and maintenance costs were higher than anticipated, tolls were too high to attract adequate business, receipts were too low to cover depreciation costs, there were too many exemptions (imposed by the legislature), to the tolls and the flatboats and steamboats provided more effective the legislature), to the tolls and the flatboats and steamboats provided more effective competition than anticipated.

THE "DARK AGES OF PUBLIC ROADS" - THE LAST HALF OF THE NINETEENTH CENTURY

The governments of the Civil War, Reconstruction, and Bourbon eras of Alabama and history have not been known as the most productive or progressive from a contemporary view, but neither were the national governments of the post-Civil War years, as Mark Twain's "Gilded Age," historian Richard Hofstadter's "Age of the Spoilmen," or some transportation historians' "Dark Ages of Public Roads" term imply. Perhaps the central theme of the era was economic

rather than political with the development of the "Industrial Revolution" of paramount importance. Railroads played a major role in this process and had, in fact, overshadowed public road developments for decades. The outside dates of this domination could be placed from 1830 when Peter cooper demonstrated the effectiveness of a steam locomotive on the Baltimore and Ohio Railroad and President Andrew Jackson vetoed the Maysville Road Bill, to 1893 when the Duryea brothers made the first successful trial trip of a "gasoline buggy" down the streets of Springfield, Massachusetts. The 1830's heralded the beginning of the railroad age, and it dominate the transportation scene for approximately a century. Jackson's action led to a "hands-off" policy of the national government of public roads, and, with ineffective state action, transportation development was left to private corporations. In the case of railroads, this evolution proved productive, but the turnpike (toll road) movement had less success. As expressed in the late 1940's by Albert C. Rose of the Public Roads Administration (Federal Highway Administration now; Bureau of Public Roads through most of its history), the 1835-1885 one-half century began with the age of animal power, was followed by the "Dark Ages" of railroad supremacy, and was succeeded, in turn, by the decades when the internal combustion engine reigned supreme "on land, in the water, and in the air."

Of course, the major occupation of Alabamians in the early part of the 1850's - 1880's era was the War with the United States and its aftermath. Two critical factors which affected Alabama's economy (including transportation) were: 1) the War was fought in the Confederacy and most of the physical damage occurred here: 2) the Confederacy lost the War and, as a result, did not participate in much of the national post-war economic development.

Most of the conflicts between Union and Confederate forces in the years 1861-1864

FEDERAL RAIDS IN ALABAMA 1861-1865

TENNESSEE

MISSISSIPPI

GEORGIA

FLORIDA

GULF OF MEXICO

Chickasaw
Tuscumbia
Bridgeport
Decatur
Triana
Whitesburg
Huntsville
Cedar Bluff
Centre
Gadsden
Blount's Plantation
Black Creek
Greensport
Ten Island Ford
Elyton
Munford Station
Tallassee
Kathryn
King's Store
Tuscaloosa
Trion
Lanier's Mill
Montevallo
Ashbyville
Randolph
Maplesville
Ebenezer Church
Plantersville
Summerfield
Selma
Lowndesboro
Benton
Montgomery
Auburn
Chehaw
Crawford
Columbus Road
Union Springs
Eufaula
Claiborne
Mt Pleasant
Owassa
Evergreen
Mobile
Blakely
BATTLE OF MOBILE BAY
BATTLE OF BLAKELY

RAID OF
Col. Abel D. Streight
CHICKASAW TO CEDAR BLUFF
APRIL 21, 1864 - MAY 3, 1864

PURPOSE OF THIS RAID WAS TO DESTROY THE RAILROADS AND FOUNDRY OF THE CONFED GOVERNMENT. COL STREIGHT AND MOST OF HIS MEN WERE CAPTURED FROM THE START AND WAS FORCED TO SURRENDER AT CEDAR BLUFF

RAID OF
Maj Gen James H. Wilson
CHICKASAW TO UNIONTOWN
MARCH 22, 1865 - APRIL 16, 1865

THIS RAID, STARTING THE HEART OF ALABAMA, WAS DESIGNED TO DESTROY RAILROADS, IRON WORKS, MANUFACTURING WORKS, AND ARSENALS AND TO PROVIDE MORALE SUPPORT TO GEN E. CANBY'S CAMPAIGN AGAINST MOBILE

RAID OF
Brig Gen John T. Croxton
CHICKASAW TO GEORGIA LINE
MARCH 22, 1865 - APRIL 25, 1865

GEN CROXTON WAS DETACHED TO PROCEED TO TUSCALOOSA TO DESTROY THE BRIDGE, THE FACTORIES, MILLS, UNIVERSITY AND ALL ITEMS OF VALUE TO THE CONFEDERATE CAUSE ALONG THE ROUTE

GUNBOAT RAID OF
Brig Gen John W Geary
-BATON ROUGE TO TRIANA AND RETURN
APRIL 12 - 16, 1864

THIS GUNBOAT RAID DOWN THE TENNESSEE RIVER HAD AS ITS PURPOSE THE DESTRUCTION OF ALL RIVER CRAFT USABLE BY THE CONFEDERATE GOVERNMENT AND TO KEEP OUT THE HANDS OF CONFEDERATE FORCES.

RAID OF
Brig Gen Thomas J. Lucas
- NEWLY TO MONTGOMERY
- 9, 1865 - MAY 5, 1865

[illegible] PURPOSES WERE: TO [illegible] FORCES AND CHARGE [illegible], TO SCOUT THE ALABAMA RIVER FOR RIVER BOATS, AND TO DESTROY ANY CONFEDERATE GOVERNMENT PROPERTY THAT MAY ALONG HIS ROUTE.

RAID OF
Maj Gen Frederick Steele
PENSACOLA FLA. TO BLAKELY, ALA.
MARCH 20, 1865 - APRIL 1, 1865

[illegible] LEFT MOVED FROM THE [illegible] AT PENSACOLA TO [illegible] THE RAILROAD JUNCTION AND [illegible] CONFEDERATE WAREHOUSE AT POLLARD, THEN TO JOIN FORCES WITH GENERAL EDWARD R. S. CANBY AND THE ATTACK ON THE DEFENSES OF MOBILE AT SPANISH FORT TO BLAKELY.

RAID OF MAJ GEN
Lovell H. Rousseau
DECATUR TO GEORGIA LINE
JULY 10 - 20, 1864

THIS RAID WAS PLANNED TO STRIKE DEEP INTO THE HEART OF ALABAMA, DESTROYING IRON FURNACES, MILLS, AND THE MONTGOMERY AND WEST POINT RAILROAD.

RAID OF MAJ GEN
Benjamin H. Grierson
BLAKELY TO EUFAULA
APRIL 17 - 25, 1865

GEN GRIERSONS RAID WAS FOR THE PURPOSE OF CAPTURING DEBATTACHED CONFEDERATE SOLDIERS AND DESTROYING CONFEDERATE SUPPLY POINTS AND GIVING ASSISTANCE TO GEN WILSON AT COLUMBUS, GA.

RAID OF LT COL.
Andrew B Spurling
MARION, FLA. TO CAMDEN STA., ALA.
MARCH 21 - 26, 1865

THIS RAID WAS DESIGNED TO DESTROY THE ALABAMA AND FLORIDA RAILROAD, THUS CUTTING OFF MOBILE FROM MONTGOMERY BY RAIL AND TO JOIN FORCES WITH GEN STEELE FOR THE ATTACK ON THE OUTER DEFENSES OF MOBILE.

[illegible] THE WAR OF REBELLION
OFFICIAL RECORDS OF THE UNION AND CONFEDERATE ARMIES
BY WILLIAM LEFFLAND
OF THE DEPARTMENT OF ARCHIVES AND HISTORY
AND ALLEN W. JONES
IN A CONTINUATION OF THE OFFICIAL RECORDS AND MAPS OF THE ALABAMA CIVIL WAR CENTENNIAL
- 1961 -

REVISED 1976

occurred in the Tennessee Valley, although the Union periodically raided other parts of the State and considerable late war action took place in south Alabama, particularly with the fall of Selma and Mobile in April, 1865. The major raids were Streight's Raid (1863), Rousseau's Raid (1864), and Wilson-Croxton's Raid (1865). Streight had limited success before being defeated by Nathan B. Forrest, but the Union raids of Rousseau and Wilson-Croxton's Raid were highly successful. Rousseau accomplished his prime purpose of cutting the railroad link between Montgomery and Atlanta before joining Sherman at Atlanta, and Wilson destroyed the Confederate ordinance and manufacturing center at Selma. Croxton's raiders, a detachment from Wilson's main column, burned the University of Alabama (a training center for Confederate cadets). After the war, Congress gave the University of Alabama public lands to compensate for this wartime loss.

The war resulted in an impoverished Alabama. The sacrifices made to support the Confederate war effort and the ravages of both armies left much of the state destitute. Manufacturing made some advances during the war and the transportation system was improved though railroads, but the Union raids late in the war canceled these modest gains.

Railroad domination of the post-war transportation picture in Alabama was echoed at the national level, but the seeds of technological change which were to make the internal combustion engine supreme "on land, in the water, and in the air" were sown in the "Dark Ages." While local citizens largely ignored the wretched state of disrepair and neglect on the public roads that were "required by law" to maintain, the inventors were making quality road and bridge construction easier, and this "paving the way" for the success of the Good Road movement and the "Automobile Revolution" which were soon to come. Unprecedented technological progress in road machinery, road materials, bridges and other means of making transportation and travel more

popular and economical was accomplished in the years from 1838-1891.

Improvements in road machinery were largely responsible for the phenomenal growth of interest and concern in land transportation. William Smith Otis patented an excavating machine (steam shove) in 1838, which was used first on the Western Railroad of Massachusetts. Dump wagons were used for road construction in 1857. Eli Whitney Blake of Connecticut, in 1858, invented the jaw rock crusher. The first steam road-roller to be used in the United States came from Britain in 1869. A steam mortar-mixer was introduced in 1877, and by 1880 the horse-drawn scraper and other ROAD BUILDING equipment were in widespread use. In 1883, William H. Diedrich of Fresno County, California, patented an improved earthscraper, the forerunner of the Fesno scraper of later years. The wheel scraper was improved the next year.

The development of new and better road materials expedited the time and reduced the trouble of travel. The Dupont Company of Wilmington, Delaware, invented blasting powder in 1856, thus making quarrying less burdensome. W. A. Gill of Columbus, Ohio, demonstrated how to clear a field of stumps with gunpowder the next year. Portland cement was manufactured in the U.S. in 1871, and two years later the first brick street pavement was laid in Charleston, West Virginia. In 1889, sand-clay surfacing enhanced the construction of roads which were adequate an inexpensive . Clay was added on sand roads to expedite travel on them in wet weather. In 1891 some general improvements in road construction were realized. The first Portland cement concrete pavement was built in Bellefontaine, Ohio; the first brick road in a rural area was constructed on the Worcester Pike in Cuyahoga County, Ohio; and a Portland cement grouted macadam road was laid in New York.

Even bridge construction saw some improvements during this period. The first cast-iron

bridge in America was built across Dunlap's Creek on the National Pike at Uniontown, Pennsylvania, in 1738. William Howe, in 1840, patented the truss bridge. For several more years no major developments occurred, but, in 1891, a Portland cement concrete arch bridge went up near Philadelphia.

Other advancements economized transportation somewhat, thus popularizing travel for leisure as well as necessity. The petroleum industry was born in 1859 with the sinking of the first oil well at Oil Creek, Pennsylvania. Colonel Albert Pope started a bicycle factory in 1877, a significant event as the cyclists, even before the motorists, demanded good roads. In 1879, George B. Selden filed the first application for a patent on the gasoline-driven automobile. Bicycle enthusiasts, by consolidating their various organizations into the League of American Wheelmen in 1880, became a more effective lobby for good roads. Five years later Starley and Sutton introduced the Rover safety bicycle, and by 1889 bicycle paths were common alongside the roads. Finally, of general significance to ROAD BUILDING in American, New Jersey passed the first state-aid road law in 1891.

Cumulatively these road and bridge building innovations constituted a technological breakthrough which provided the background for the Good Road movement and the Automobile Revolution. The increased technology allowed greater freedom of movement to a nation that was always on the move. Perhaps the "Dark Ages" were not so dark after all.

THE GOOD ROADS MOVEMENT, 1890's - 1920's

The "Dark Ages of Public Roads" era may not have "paved the way" for the Good Roads

movement, but it did set the state. Technological innovations made possible the building of better highways and, in the case of the bicycle and the automobile later, helped create a demand for better roads. Technology and urban origins could be over-stressed in relation to the Good Roads movement in the South and Alabama, however, as there were many other pressures for improved roads. The demand for good wagon road for farm-to-market purpose was clearly stated by the farmers' movements in the late nineteenth century, and the desire for rural free delivery of mail was also important by the 1890's. Farmers' demands for good wagon roads and better mail service came prior to the "Automobile Revolution" and were certainly more important to rural Alabamians and Southerners than the urban, urbane, and Northeastern drive for bicycle pathers. The farmer, in whichever section he resided, may have also been slighted in his national impact. The United States Government's break with a half-century tradition of hands-off attitude towards public roads occurred in 1893 with the establishment of the Office of Road Inquiry in the Department of Agriculture. The national effort of highways was directed from the same department until 1939.

The distinction between the rural agricultural drive for farm-to-market roads and the urban-manufacturing focus on the main arteries is clear in the Congressional debate on federal legislation prior to 1916. The Federal Highway Act of 1916 represented a compromise, but the post-1916 automobile growth, the Republican-manufacturing domination of the national government in the 1920's, greater urbanization coast-to-coast, and the logic of the priority of the national government on interstate and main artery development cumulatively resulted in the triumph of the non-farm forces. The urban-manufacturing triumph was revealed as early as the Federal Highway Act of 1921 with the national focus of aid only to the main highways of the

states (the top seven percent in significance for interstate travel). Subsequent federal legislation followed the same trend. In fact, farm-to-market roads, with the exception of the intermittent state-matching funds, are still a local responsibility in Alabama as in most rural areas elsewhere in the country.

The "Dark Ages of Public Roads" which resulted in continuous mudhole highways in the United States while European countries were experimenting with improved methods of building and administering roads were attributed to several factor by Charles Earing, in his American Highway Policy book for the Brooks Institution (Washington, D.C., 1941). They included the bastness of the United States, the effort to maintain too many highways, the expense of repairing them properly, popular indifference, and a defective system of road laws. Daring considered the last factor the most significant.

Under the local system of road repair direct supervisory control over the building and repair of roads was placed in the hands of annually elected district overseers. Road residents could pay an annual tax or work on the road. Under this system, "sitting on the fence smoking clay peipes and swapping stale stories has long been synonymous with 'working out the road tax.'"

Since amateurs handled road-making, highway engineering as a profession was practically non-existent. As late as 1890 no engineers had been trained in the specialized field of highway construction, few engineering schools existed, and there was little technical literature on highway construction.

A combination of factors contributed to a change in this situation by the last nineteenth and early twentieth centuries technological advances during the "Dark Agaes;" the bicycle

movement of the 1880's; the Populist crusade for good roads in the 1890's; rural free delivery of mail and Post office requirements in regard to adequate post roads; academic, associational, and governmental educational efforts to promote good roads; railroad support of farm-to-market (or farm-to-railroad terminal) roads; and the "Automobile Revolution." There were numerous nineteenth century technological advances in road machinery: the steam shovel, dump wagons, the jaw rock crusher, a steam mortar-mixer, the horse-drawn road scraper, and the Fresno and wheel scrapers. Road material innovations appeared in such forms as obstacle-clearing gunpowder, Portland cement, sand-clay surfacing, brick roads, and improved processes in macadamized roads.

Chronologically first among the good roads promoters of the late nineteenth century were the bicycle enthusiasts. The general-use bicycle dates from the development of the geared, low-wheeled "safety bicycle" by James Keep Starley of England in 1885. Some years earlier a Civil War veteran, Colonel Albert A. Pope, had imported British bicycles to the United States, and in 1878 he became the pioneer of American bicycle manufacturing. Pope also became a good roads advocate of the first order and made no secret of his motivation - to make money selling his "Columbia" bicycles. Later automobile manufacturers proved less candid, but their support for good roads was as enthusiastic as Pope's. In both cases, the general public profited from the manufacturer's material pursuits. The early cyclists had problems with unreasonable restrictions on speed and with legal devices such as the requirement to dismount when approaching a horse, but their main difficulty remained poor roads. The League of American Wheelmen, founded in Newport, Rhode Island, in 1880 to promote bicycle touring, became the major campaigner for good roads. When founded, three-fifths of its members came from New York and Massachusetts, and only twelve percent were west of New York State. The residences of the members and the

initial cost of the bicycle ($150 to $200) led to charges that they were a group of "idle rich" Northeasterners. Pope's pompous and paternalistic articles about "indifferent farmers" may have restricted the bicyclists' influence, but the final effect of the bicycle movement was to convert some Northeastern urban dwellers to the cause of good roads.

Agrarian unrest, culminating in the Populist revolt of the 1890's, also contributed to the Good Roads movement, especially in the rural-agricultural South and West. The farmers wanted good roads to get their products to market. The cost of hauling varied with the type of road and, while the specifics of this condition awaited analysis by highway engineers, the essence of the cost and difficulty of travel was obvious. The Commissioners of Mecklenburg County, North Carolina, pioneers of local aid to road building, noted that prior to their improved roads some farmers could pull only one bale of cotton over the road to market with their two mule teams, yet, with improved roads, the same farmers could pull twelve bales with two mules. The savings in time and equipment use was apparent. With agrarian support a National League for Good Roads was founded in 1892, and the nest year a Good Roads convention was held in Washington, D.C. Its efforts resulted in the creation of the Office of Road Inquiry in the Department of Agriculture in 1893.

Although initially having an appropriation of only $10,000, the Office was a beehive of activity - the spearhead of the educational campaign for good roads and the chief factual-colllection point of the Good Roads movement. The first director was General Roy Stone who was succeeded six years later by Martin Dodge. The name changed to the Office of Public Roads in 1905, and the new head was Logan Waller Page. On Page's death in 1918, Thomas H. MacDonald became the "Chief" and remained the agency's head through several name changes

and eventual transfer from the Department of Agriculture to the Department of Commerce, until his death in 1953. The farmers, in effect, initiated the federal government's renaissance in roadbuilding - after a half-century of dormancy.

Perhaps even more significant to farmer support of good roads, because of its newness, was the necessity of good roads to secure rural free delivery of the mail (and later parcel post). Historian Wayne Fuller summarized the significance of rural free delivery to the South and its connection with the Goods Roads movement in two articles, a 1955 in the Mississippi Valley Historical Review (now the Journal of American History and a 1959 article in the Journal of Southern History. He concluded that in the examination of the forces behind the Good Roads movement "nothing was more responsible than the rapid development of the new rural free delivery system." While the work of the Office of Public Road Inquiry and the National Good Roads Association was in its infancy, rural mail delivery was inaugurated in 1896 on an experimental basis, and six years later it was permanent part of the postal system. The mail service accented the need for good roads, and the Post Office Department know that the success of the service rested upon good roads. The Department established the policy in 1899 that rural mail routes would not be laid out where the roads were not in satisfactory condition. A route inspection system was established in 1901 to check the condition of the orads. If they were unsatisfactory, the Department notified the appropriate officials, and, if the situation was not remedied, services could be discontinued. At normal times, however, the backbone of the Department's drive for better roads was the rural mail carrier. As Fuller noted:

This man was often the most aggresive good-roads advocate in his community. Of necessity he watched his roads with care, for poor roads doubled his work and sometimes meant a forfeiture of part of pay if because of them he omitted a part of his route. He knew the ruts and washouts

along his route, the road's composition, where the rain would stand after a spring downpour, and where the snow was likely to drift in winter. Such information he passed along to the local road authorities who learned in this way much about their roads they had not know before and were at the same time prompted to repair them.

According to the Post Office Department estimates from postmaster reports, approximately $70 million was spent on roads used for rural mail routes from the inauguration of the service to 1908. This was almost as much as the total appropriation in the Federal Highway Act of 1916.

Of course, some Congressmen seemed to have better luck in securing mail routes than others. Representative James Hemenway, Republican from Indiana, had approximately 100 routes in his district in 1903. Speaker of the House Joe Cannon of Illinois has 160 routes in his district, and Iowa's influential William Hepburn's district had 190. When Southerners noted the large numbers in these districts, Hemenway commented that it was the most "active members of Congress" who got the most routes. Henry Clayton of Alabama had another explanation for the fact that there were only 129 routes in the entire state in 1903: "I have been exceeding active...but did not happen to be... Republican."

Although they had fewer routes than other selections of the country, Southerners profited immensely from the routes they did have. In Davidson County, Tennessee, for example, mail carriers delivered 652 letters and 1,259 newspapers the first month after the mail service started in May, 1901, and, five months later, they delivered 6,980 letters and 13,554 newspapers. The cultural impact of this increased communication further increased with the establishment of parcel post in 1913, which enabled the farmer to order goods by mail not avaiable in the country crossroads stores. The farmers enjoyed these new pleasures and labored longer on their roads to

insure that the service was maintained. Rural roads becoming post roads also helped to break down the constitutional scruples against Federal aid for road building as the constitution expressly covered national aid for post roads. John Hollis Rankhead, Sr., of Alabama, used this rationale to secure support of his Federal Highway bill of 1916.

Many members of the academic world also got involved in the early stages of the Good Roads movement. Some of the leaders included Nathaniel S. Shaler of Harvard; Lewis M. Haupt, head of the civil engineering department of the University of Pennsylvania; and Jeremiah W. Jenks, professor of political science and English literature at Knox College, Illinois. Shaler was a professor of geology who recommended the establishment of highway engineering courses in the agriculture and mechanical colleges, the development of the county as the administrative unit for road work, the use of state engineers to supervise the construction and maintenance of roads, and the designation of a national highway commissioner in the Department of Agriculture who would disseminate technical information on road building. Haupt wrote A Move for Better Roads and Jenks wrote, among other things, an article, "Road Legislation for the American State" for the Publications of the American Economic Association. Jenks observed that one of the main problems of road improvement of the 1880's was that "a very large proportion of our people have never seen a really good road for hauling purposes, and have in consequence no clear idea of the gain that would come from good roads." His views apparently encouraged the later Good Roads Trains and their display of the benefits of good roads. Both Haupt and Jenks promoted centralized highway administration and finance.

The League of American Wheelmen and the temporary National League for Good Roads were early prominent association promoting good roads, but they were shortly joined by several

other organizations, among which were the American Road Builders Association (organized as the American Road Makers), the American Association of State Highway Officials, the American Automotive Association, and the Highway Research Board of the National Research Council. The Wheelmen had several publications which carried their good roads promotional material, Manfacturer, American Athlete, Good Roads, and Elliott's Magazine. Other organizations also had similar publications.

Government officials were also active in good roads promotion. General Roy Stone, Martin Dodge, Logan Waller Page, and Thomas H. MacDonald were federal examples and Joseph Hyde Pratt of North Carolina and Senator John Hollis Bankhead, Sr. of Alabama were state leaders who popularized the Good Roads movement.

In fact, Alabama's Senator Bankhead was aptly dubbed "The Father of the Federal Aid Road Act of 1916" by American Motorist upon the Senator's death in 1920. As Chairman of the Senate committee on Post Offices and Post Roads, he had popularized the constitutionality of post roads and periodically introduced bills appropriating money for their construction until finally, in 1912, a $500,000 appropriation was adopted. The 1912 measure required local areas to pay two-thirds of the cost of such roads. Seventeen states and local subdivisions responded, and 425 miles of roads were improved. More importantly, it brought the Federal government into road building, and the Bankhead-Shackleford Federal Highway Act of 1916 resulted. Bankhead also promoted good roads outside the halls of Congress by serving as President of the United States Good Roads Association and giving numerous speeches. His 1908 speech in the Senate, widely distributed by the National Grange, summarized many of the good roads arguments. A widely-quoted excerpt from the speech was:

This country has the poorest roads...in all else, we are progressive and stand first: in material wealth, varied resources, agricultural products, iron, steel making, number of miles of railroad, wealth, opulence of the cities, yet the farmers have had less done for them than any other class op people. Good roads are avenues of progress, the best proof of intelligence; aids social and religious advancement, increases value of products, saves time, labor and money, initial sources of commerce. The highways are the common property of the country; benefits are shared by all; needed by all, benefits all, and all should contribute to them. What fair-minded man will say that the people who live on public roads should be required to build and keep in repair for use of the general public? The burden is more than they should bear. No government has ever enjoyed good roads where compulory labor is relied on to build and maintain them. Are savings affected by good roads? There would be a reduction by half of annual cost of transportation to farmers. Aid should be extended for liberal appropriation for improving our roads. It will benefit cities and by a blessing to rural districts. Good roads will add to modern improvements to rural life. Give farmers good roads and with the telephone, rural delivery bringing easy contact with the outside world, daily intercourse with nature, he will prove the most prosperous and contented, patriotic citizen on the American continent.

The Bankhead National Highway was named in honor of the Alabama senator. This memorial highway was promoted by Bankhead's lifetime friend, Colonel Thomas S. Plowman of Talladega, Alabama, who had served in the same Alabama company (C.S.A.) with Bankhead. Plowman was President of the Bankhead Highway Association, but a major organizer of the activities was the Bankhead Association Secretary, J.A. Rountree, who was also Secretary of the United States Good Roads Association. The Bankhead Highway began with an improved highway between Atlanta, Georgia, and Memphis, Tennessee (through Birmingham and Jasper with a branch line to Sulligent), but the highway was to be transcontinental, with the Atlanta side extending to Washington D.C. and the Memphis side continuing to San Diego, California, on the Pacific coast.

Bandhead's role in the Good Roads movement accents even further the agrarian influence, particularly in Alabama and the South. Upon election, the Senator stated, "Alabama needs a farm Senator and I am going to be it." His persistence in the good roads crusade earned him the title

of "Father of the Federal Aid Road Act." Considering his additional groundwork on the 1921 legislation (called by the press the Bankhead-Townsent Act - prior to Senator Bankhead's death in 1920), he could also be justly called the "Father of the Interstate System."

Bankhead and the farmers he represented got an unexpected ally in their drive for farm-to-market roads when the railroads came into the fray. They realized that the carrying trade of the railroad was limited to the trade areas of the towns the railroads served. Farm-to-market roads would enlarge these trade areas and contribute to more rail transportation. In fact, in the early days, good roads acted as feeder lines for railroads. The railroads quickly saw that the through roads sought by the automobilists would decrease their passenger fares, however, and by 1910 were launching a farm-to-market counter drive. Of course, increased automobile registrations and better interstate routes of travel did eventually curtail the railroads' passenger-carrying business but, even more unexpectedly, the motor transport development during World War I served notice of even more significant competition. Generally speaking, however, railroads maintained their support for good roads through World War I, although they regarded motor transportation as a serious competitor as early as 1916. The specifics of the "Automobile Revolution," and its impact on good roads, is developed in the following chapter.

In the promotion of good roads, the propagandists pulled out all stops. They wrote, printed, and distributed good roads literature, organized conventions, offered prized for essays on road improvements, circulated photographs contrasting good and bad roads, formed good roads associations, constructed model highways, and operated "good roads trains." In 1901 the Southern Railroad Company dispatched a good roads train for a five-month tour through the Southeast (including Alabama). It covered six states and more than 4,000 miles. At eighteen

different locations its crews built object lesson roads while its experts held conventions.

No arguments were withheld in tribute to the road. L. I. Hewes, Chief of the Division of Economics and Maintenance of the Office of Public Roads, Department of Agriculture, stressed the economics of good roads. Hauling costs would be reduced as much as eight cents (from twenty cents to twelve cents); land values along improved roads would increase (specific examples showed increases of thirty-seven percent to 333 percent in three years - 1909 to 1912); and automobile touring would increase with an increase in tourist dollars. Hewes also noted that good roads would mean better, more consolidated schools and would improve attendance, (sample increases of five percent to thirty-five percent were given.) Advantages cited by other writers included: savings on perishables not perishing before they were marketed, reduced fire insurance, better gasoline mileage on improved roads, and better churches.

In the early twenties, H. S. Firestone offered a four-year college scholarship to the high school student who had the best essay on some aspect of road improvement. In 1923 the subject was religion and highways. The winning entry was by Miss Dorothy Louise Roberts of Harlen, Kentucky. Her theme, and that of the other leading essays published in The American Review of Reviews, was "good roads mean better communication." More association with the outside world would increase the opportunity to worship in churches with educated ministers and a congregation large enough to have all those skills needed in a successful church. With poor roads the settlements were isolated, the churches small, and the ministers and congregations unusually uneducated and unskilled.

As summarized in a Literary Digest articles in November, 1920 titled "Good Roads and Better Churches," her argument was:

Where good roads exist, the Church has prospered. Enriched by the fruits of better highways, the congregation has been liberal in improving and maintaining the church. The size of the congregation has increased, and those to whom the opportunity for Christian service has been given are made the leaders of larger groups of followers and the possessors of a wider opportunity for furthering the teachings of Christianity.

Just as the good road has enlarged the areas from which the congregation is drawn, so has the automobile helped to create a wider range of influence for the church. The sight of several dozen cars parked about a county Church is not uncommon in districts where roads have been improved. And it is a notable fact that people will often attend the church which can be reached by good roads in preference to the one located on an unimproved highway.

Regardless of the causes of the Good Roads movement or the motivation of its supporters, the basic reason for it was the poor condition of roads everywhere in the country, particularly in the South and in rural areas. Logan Waller Page, the well-known "Apostle of Good Roads," commented on the road conditions in a 1910 article in South Atlantic Quarterly. Page was a Harvard educated engineer who served as the state geologist and testing engineer of the highway commission of Massachusetts prior to becoming the Director of the new Office of Public Roads (which succeeded the Office of Road Inquiry) in the U.A. Department of Agriculture in 1905.

It is hard to conceive ... that we of progressive America should for so long have remained contented to maintain our public roads, ... in a condition little less than disgraceful ... Our public roads ... are among the most sadly neglected to be found on the habitable globe.

This is expecially true in regard to the South. According to information gathered by the Office of Public Roads, there were 2,155,000 miles of public roads in the United States in 1904, of which 790,284 miles were in the South. Of this 790,284 miles, only 31,780, or just a fraction over four percent, were improved, while for the whole United States 7.14 percent of the total mileage was improved. The expenditures for roads in the South for the same year, 1904, were $12,636,838.63 in cash and $11,232,013.80 in labor.

Page also noted: "Conditions in the South require road improvement more urgently than in the North, for the reason that in the South the roads are subjected to more continuous traffic during

the winter months, and, as they are most always wet at this season, they are cut up very badly and became almost impassable."

He was likewise negative about the general lack of compotent state-supervised and engineer-directed highway programs in the region. He observed:

The roads of the South can be improved much more cheaply than those of the North. In the South, labor is cheaper, and convict labor can be used to a greater extent and more successfully than in the North. Also a cheaper type of road can be adopted in the South than in the North, as in the South sand-clay roads can be constructed which will answer all ordinary traffic requirements and cost only about one-tenth as much as macadam, or other roads suitable to northern conditions, will cost. Then too, roads in the South are not subject to as severe frosts and freezes as in the North, and consequently the injury from this prolific source of damage to roads is only slight, which necessarily makes the cost of maintenance less in the South. So, while the South stands in greatest need of road improvement, its conditions are most favorable for meeting that need.

In the same journal, four months later, the State Geologist of North Carolina, Joseph Hyde Pratt, echoed Page's sentiments: "While we as a nation take first rank in civil government, manufacturers, commerce, and in the world's affairs generally, yet improved road construction - the one material phase of American life which affects more than any other the prosperity and social comfort of a large majority of our citizens - has been neglected in a most inconceivable manner."

Pratt attributed this neglect to the attitude that the roads were public property and it was not considered good businees for an individual to spend his resources for the benefit of the general community. Pratt's arguments were typical of good roads advocates throughout the United States:

But, while they are public property, they are also the common property of all the people, and all the people have the right and privilege of using them. Therefore, all the people should bear some of the expense of their construction and maintenance. Every inhabitant of a community, from the largest to the smallest taxpayer, will receive a direct or indirect benefit from

the existence of the public road, even though, from lack of means or other reasons, he does not possess any stock which travels over the improved road; for he is benefited in the uplifted tone of the community, in the general increase in values which has never failed to follow in the wake of public road improvement, and in the increase of trade and demand for labor in both town and country. In deed, so universal in their operation are the good effects of improved roads that it is difficult to confine their benefits to any class of people or to any individual line of action.

The problem of financing public roads was not unique to Pratt's day; it was a problem before the Good Roads movement and a continuing one to the present. The immediate solution for the Good Roads forces was highway bonds, and this method of financing continued in later years. Revenue to retire and to pay the interest on these bonds was another matter. Several taxes were used, but the most successful was the gasoline tax developed during the "Automobile Revolution."

The difficulties of traveling the bad roads noted by Page and Pratt were well illustrated in the account of a 1909 automobile trip by Paul Hoffman, President of Studebaker Corporation. The trip was made in his father's 1905 Pope-Toledo, a second-hand car purchased for about $1,500. The trip was from Western Springs, Illinois (southwest of Chicago), to Sycamore, Illinois, approximately sixty miles away. The trip was made in the spring after several weeks of preparations. This is how he told the story at the 1939 Purdue Road School:

In the first few miles I changed four spark plugs. Otherwise, everything was lovely.

On the far side of the Fox River I tried to shift from third to second gear to climb a hill and failed. When the car was out of gear there was no service brake. We started to roll backward. My aunt screamed, tossed out the lunch basket, and followed it herself in a flying leap. I stopped the car by backing into the bank.

After trying again and making the grade, we reached a fork in the road. Nobody knew which one to take, and we had no maps. Father said "left" and Grandfather said "right." Grandpa had the more positive manner and we went right. We should have gone left.

It began to rain. Considerable time was lost putting up the curtains. The road became a

bog in which we finally sank. I cut brush to give the wheels traction. We got out of the first mudhole, went a short way, sank again.

Night came on. I lighted the headlamps. Old-fashioned rock-carbide lamps, they flickered and flickered, went out. No help at all for seeing ahead. We slid into the ditch and were stuck for good. A neighboring farmer gave Mother and Aunt a bed for the night. My aunt nearly had hysterics because a woman had had her head chopped off in that house, and the farm wife insisted on telling her about it.

Next morning we managed to get out of the ditch under our own power. We had come forty-five miles and had had enough; we headed for home.

Presently the engine stopped cold. Trying to crank it, Grandpa gashed his forehead on the sharp top of the radiator. The cut bled freely. My aunt and my mother began to weep.

I discovered what was wrong with the engine. A valve at the bottom of the crankcase had been turned when we were stuck in the ditch. The oil drained out, the engine "froze!" I had extra bearings, and I found that the engine would die if the car speed dropped below thirty miles per hour.

At St. Charles, where we had started to roll downhill the day before, the two ladies got on the street car and went home. The nearest garage was at Aurora, fourteen miles away. We three men headed for it. We struck at least fifty "thank-you-ma'mas"in the road between Aurora and St. Charles, taking them at thirty. Grandpa used most of his vivid vocabulary.

The car stayed in the Aurora garage about a month and was practically rebuilt...

Hoffman's trip fit in with the popular wisecrack of the day that "almost any car could take you back." Hoffman noted that tires cost $75 to $90 each and would last for about 2,500 miles although punctures were frequent. Some car manufacturers did not include tires with their products but let customers pick their own. This took the heat off when the tires failed.

Early auto trips were also complicated by the antipathy of farmers towards the noise-producing horseless carriages. Their animosity was sometimes moderated by making profits on stranded motorists. One story was reprinted in William McGauhey's American Automobile Album (N.Y., 1954):

One Sunday motorist, forced to detour from a well-traveled route, unexpectedly plunged into a deep, muddy hole. A farm boy rounded the bend with a tean of horses, set his price - stiff one - and with speed and dispatch extracted the motorist.

"Do you farm on Sundays around here?" inquired the motorist, as the boy prepared to leave.

"Nope, we just pull cars outta the hole."

What do you do Saturdays nights. Go out?"

"Nope", replied the youth. "Just haul water to the hole."

Some states' efforts at road improvement came long before the problems of the stalled motorist. Renewed travel abroad after the Civil War gave some Americans an appreciation of the contrast between good European roads and poor American roads, and there was a few state reform efforts. Leading areas in the good roads drive of the 1870's were Essex County, New Jersey, Mecklenburg County, North Carolina, and the state of Massachusetts. State aid to highways began with a New Jersey law of 1891, although Massachusetts followed in 1894, Connecticut in 1895, and New York in 1898. Alabama did not have a Highway Commission until 1911. However, Alabama preceded more than one-half of the states in having a state-directed highway programs. In fact, at the time of the Federal Highway Act of 1916, there were still twenty-six states without highway departments.

State and national efforts at road reform in the early period were often sensational. There were three transcontinental automobile trips in 1903 (the fastest was fifty-three days), and the idea of a national highway from coast-to-coast was dramatized by Carl Graham Fisher in the 1911-1915 era. Fisher, founder of an automobile headlight company (Prest-O-Lite), and promoted of both the Indianapolis Speedway and the commerical development of Miami Beach, Florida,

sugggest the New York to San Francisco highway project to be known as the Lincoln Highway. Fisher hoped to see the road available for use by the time of the Panama-Pacific Exposition near the Golden Gate in May, 1915. Early supporters and contributors to the project were Frank A. Seiberline, founder-president of Goodyear Tire and Rubber Company; Henry Bourne Joy, founder-president of Packard Motor Car Company; Roy Chapin of the Hudson Motor Car Company; George W. Bennett of the Willys-Overland Company; Edsel Bryant Ford (but not his father Henry); and A. W. Gowen, president of Lehigh Portland Cement Company. The road was not built by 1915, but the publicity concerning it motivated the foundation of more than one hundred other road associations, each created to promote the construction of some particular stretch of road.

While people at the state and national level promoted road improvements, state and national geologists and engineers publicized the technical requirements for successful roadbuilding. The Office of Public Roads Director, L. W. Page, stressed administrative improvements: state participation in road work, state highway departments, the use of state money and/or convict labor, and competent engineers to head the state effort. J. H. Pratt, State Geologist of North Carolina, promoted highway bond financing, the use of professional engineers in road work, and the need for systematic maintenance after the roads were constructed. Pratt also outlined considerations in selecting the kind of road to be built, explained types of roads commonly constructed in the South and described how to construct good roads. Conditions noted in considering the kind of road a locale should construct were: 1) availability of suitable road-building material; 2) estimated amount of traffic over the road; and 3) wealth of the area which has to pay for the road. Types of roads generally used in the South were macadam, gravel

and sand-clay. Macadam roads were normally the best, but the availability of materials restricted their use. Such roads were especially expensive in the coastal plain area. Gravel roads, when "well made and thoroughly drained," were considered adequate and sand-clay roads, with the proper mixture of sand and clay (which varied with the earth at the road side), also gave good service. When well maintained, the cost of hauling over them was "as low as over a macadam road." Pratt's instructions on roadbuidling and its priorities were:

It is to the advantage of the county to construct the main roads or arteries of travel of macadam, sand-clay, or gravel, and then to improve the dirt roads leading off from these main roads by relocating and grading these roads so as to reduce the grades to not over 4 1/2 percent; crowning them, so that all the water will readily run off their surface, and ditching them, so that the water can be carried quickly away from the roadbeds to keep them from softening. In this way the dirt road can be kept in good condition practically the whole year, except during periods of freezes and thaws.

The ideas of Page, Pratt, and earlier writers on the proper (or the practical) method of highway administration, finance, and construction were generally followed in the first three decades of the twentieth century, but the crowning achievement of this period and the culmination of the "Good Roads" movement was the Bankhead-Shackleford "Good Roads Act" or the officially-known Federal Highway Act of 1916. Secretary of Agriculture David F. Houston summarized the Act:

1. Authorizes the Secretary of Agriculture to cooperate with the States through their respective State highway departments in the construction of rural post roads...

2. No money appropriated by the act can be expended in any State until the legislature of the State shall have assented to the provisions of the act...

3. Federal money may be expended only for the construction of post roads. To maintain the roads constructed under the provisions of the Act is made the duty of the States or of their civil subdivisions according to the laws of the several States, and it is provided that, if the Secretary of Agricuture shall find any road in any State so constructed is not being properly maintained within a given period, he shall give notice of this fact to the highway department and, if within four

months from the receipt of the notice the road has not been put in the proper conditon of maintenance, no further aid can be extended to such State or civil subdivision...

4. There are appropriated out of the Federal Treasury for carrying out the general purposes of the act the following sums of money: For 1917, $5,000,000; 1918, $10,000,000; 1919, $15,000,000; 1920, $20,000,000; 1921, $25,000,000...

5. The contribution of the Federal Government for the construction of any road is limited to 50 per cent of the estimated cost of it and cannot exceed 50 per cent of the actual cost...

6. The Secretary of Agriculture, after making a deduction not exceeding 3 per cent of the appropriation for any fiscal year for administrative purposes, is authorized to apportion the remainder for each year among the several States on the basis of three factors - population, area, and mileage of rural delivery and star routes - each factor having a weight of one-third...

7. The State is the lowest unit with which the Federal Governemt may cooperate and only through a State highway department...

8. ... out of any Federal money not otherwise appropriated the sum of $1,000,000 a year for ten years may be expended under the supervision of the Secretary of Agriculture upon request from the proper officers for the construction and maintenance of roads and trails within or only partly within the National Forests.

Alabama's apportionment for 1917 was $104,148.90, and the State's total for the 1917-1921 years was $1,562,233.50. These totals ranked nineteenth in the United States and fifth of the states of the Confederate South.

The 1916 Federal Highway Act was followed by a 1921 Act, and federal aid to highways was launched on a permanent basis. These and subsequent federal-aid-to-highway acts cumulatively led into the current Interstate Highway System.

While federal funds became a major source of highway finance, the states also got into the act with a series of new taxes to support their road systems. The most successful of the new levies was the gasoline tax. Since 1919, the year of its origin, the gasoline tax financed over half of the main highways of the nation.

Historian John C. Burnham surveyed the history of the gasoline tax in a 1961 article in The Mississippi Valley Historical Review. The tax developed spontaneously in three western states (Oregon, Colorado, and New Mexico), and spread throughout the nation in the 1920's. Oregon was the first state to adopt the tax in the United States although President Wilson had unsuccessfully sought such a national tax in 1915, and Great Britain had operated a gasoline tax since 1910 (specifically as a user tax to raise highway funds).

When the twentieth century opened, the usual sources of highway funds were property taxes, poll taxes, and labor levies. The Federal Aid Act of 1916 allowed federal matching funds to states on fifty-fifty ration, but the taxes for highways were still primarily of the non-user variety. In 1921 the main sources for state highway expenditures were property taxes and general funds, federal aid, bond issues (partially financed by highway user taxes), and automobile registration-fees. (Missouri started using this in highway finance by 1903.) Automobile registration fees constituted about one-fourth of the total funds. Income from registration (license) fees doubled between 1918 and 1920, and that sum tripled by 1927.

The gasoline tax, however, quickly became the most significant revenue producer. By 1925, only six years after the first laws, forty-four states and the District of Columbia had imposed a gasoline tax, and by 1929 the last holdout, New York, had capitulated. By then rates of three and four cents were common, and in that year the states collected $431,000,000 in gasoline taxes. From the beginning, supporters of the new levy recognized that the gasoline tax was superior as a user tax because the amount of gasoline consumed in a vehicle was a good measure of the use of the road and also of the damage that a vehicle did to a road. Legislators were favorable also because from a public administration standpoint the gasoline tax had the

unexpected advantage of being extremely inexpensive to collect. In the early years the cost of collection was less than one percent. Furthermore, the tax was, of course, paid in driblets, traditionally a painless and effective way to levy assessments on the public without creating resistance.

Opposition came slowly. It was not until about 1923 that tax experts and oilmen became generally aware of the gasoline tax. Although Standard of California opposed raising the rates of gasoline anywhere after 1925, general opposition in the industry did not accur until the American Petroleum Institute announced its opposition in 1929. By that time the tax was permanent and accepted institution. The rate increased from a national average of .06 cents in 1919 to 3.04 cents in 1928; 5.44 cents in 1938; 6.34 cents in 1948; and 8.88 cents in 1958. Alabama's gasoline tax has remained seven cents since 1955. Only four other states (Hawaii, texas, Nevada, and Oklahoma) had lower rates in 1975 and only four other states (Montana, Nevada, Tennessee, and Oklahoma) have not increased their gas tax rate in the last twenty years.

More opposition to the tax in the early days came from the disposition of the tax proceeds than over the tax itself. The farmers opposed any but farm-to-market roads. The users of city streets, such as local bus lines, influenced legislatures to allot part of the income from the tax to municipalities for streets. Bus and truck operators who used the state highway system often broke ranks to favor the tax, the returns of which would, of course, improve their service.

In the decades after World War II, American annual automobile production outstripped all efforts of the state and federal governments to raise money for highway construction. So crowded were the roads and so great was the demand for more highways and heavies construction that thousands of miles of toll roads were constructed. On these roads motorists

willingly paid not only gasoline taxes but also tolls for the privilege of using through highways which could not otherwise have been built because of politics or lack of funds. The gasoline tax developed spontaneously to meet just such unprecedented demands for roads in 1919, and forty years later hard-pressed legislators continued to raise even more money from taxes based on highway use. The automobile revolution thus in part automatically perpetuated itself, but through the agency of a public unmistakably willing to pay for its highways. In the light of such a history, it appeared even after the Highway Revenue Act of 1956 that state and federal governments had not yet explored the limits of the gasoline tax for building roads and thus further transforming American society.

The "Good Roads" movement ended the "Dark Ages" of public roads, but the "Automobile Revolution" which followed made necessary a continual "Good Roads" movement through the current era. As noted by Frederic L. Paxson, Professor of History, as the University of California in "The Highway Movement, 1916-1935" (American Historical Review, January , 1946):

The interplay of better roads and better casrs set up an endless competition. When the concrete road was built, the maker could sell a faster car; the faster car called for a road wider, safer, and more nearly straight. Every improvement by the highway engineer was matched by increased demands from users. Each new pressure forced a reconsideration of specifications, a broadening of the roadbed, heavier grading, and perhaps relocation of the road itself. Every year produced a new definition of what constituted an adequate highway. From stone surface it advanced to concrete strip. From single concrete lane, it spread to two or three or many. From clinging to the terrain it was shifted to new location with cuts and fills which put the railroad engineers to shame. And the interplay had no end, however deeply the research departments of the road builders studied the problem, or drew upon the scientists in the Bureau of Standards of the National Research Council.

THE "AUTOMOBILE REVOLUTION"

Nothing has revolutionized American life like the snorting, bucking horseless carriage which burst upon the American scene in the last five years of the nineteenth century and became a family necessity within twenty-five years. Frontier marshals such as Wyatt Earp lived to see state troopers in high powered, radio-equipped patrol cars give chase to outlaws over miles of smooth macadam highway.

By the 1920's widespread automobile ownership gave a sense of power to common citizens which was formerly reserved for the elite. Earlier, the man on horseback looked down on the man on foot; he was stronger in a physical showdown, he was superior in that he was relieved from walking and had the class distinction of being relatively immune from sweating, and he exercised physical dominion over the man on foot and over the horse he rode. In like manner the man behind the wheel has command over time and space; his physical size and agility is determined by the machine he possesses. The horseman had a radius of forty miles and range of five thousand square miles. The motorist commands a comfortable radius of more than four hundred miles and a range exceeding half a million square miles.

The early "Automobile Revolution" also developed its own language with new-fangled terms such as garage, filling station, coupe, sedan, taxi, parking lots, auto mechanic, thumb a ride, hitchhiker, joy rides, necking in the parked car, gasoline gypsies (migrating workers), Greyhounds, road maps, courtesy cards motor clubs, travel bureaus, tourists, service the car, lubrication. "How many miles did you make today?," How may miles did you get per gallon?," "Does your engine heat?," How did your can behave?," engine tune-up, recharging the battery, flushing the radiator, changing the oil, simonizin, trade-in, double-parking, traffic cops, road hogs,

back-seat drivers, and many other unusual and radical expressions from the standpoint of the late nineteenth and early twentieth century public.

Nor was the impact of the "Automobile Revolution" limited to language. Although Europeans, particularly the French and Germans, had been successfully operating self-propelled vehicles as early as 1770, Americans did not get in the "invention" of automobiles until the late nineteenth century. The delay of the U.S. as a leader or even active participant in automotive development was due to the poor condition of highways, public hostility, and the hesitancy of financiers to risk their funds in efforts whose outcome was uncertain. In addition, it was not at first recognized which source of power - steam, electricity, or gasoline - would be best. The adent of the bicycle and the subsequent "Good Roads Movement" did much to improve the highways and sway public opinion in favor of vehicular transportation. After 1910, wealthy sponsors felt more comfortable about backing the original inventors. This was a significant boon to the development of the automobile since most of the pioneers in the automotive industry were not themselves capitalists: John Willys and the Dodge brothers were bicycle dealers; Walter P. Chrysler was a railroad employee; R. E. Olds was a machinist; and Henry Ford made inexpensive watches.

It was soon discovered that steam engines required special handling and electric cars needed constant recharging, so it was generally agreed that gasoline-powered engines were most suitable since petroleum was plentiful and readily accessible. United States patents for gasoline engines were issued as early as 1867. George Selden, a patent attorney from Rochester, New York, first applied for a patent on a gas-powered automobile in 1879. He was granted full rights in 1895, collecting hundreds of thousands of dollars from car manufacturers until his patent rights

were more narrowly defined in 1911.

Apparently, in September, 1893, either Charles or Frank Duryea drove the first gasoline powered car in the United State. By the end of 1894 from four to six other "first" cars were also constructed. The automobile itself cannot be attributed to a single inventor, however. Each of the early manufacturers can only be credited with inventing his own machine, as the self-propelled motor vehicles were aggregates of many inventions already in use.

In explaining the original inspiration, Hiram Percy Maxin, an early automobile builder, remembered that, "the idea came from looking down and contemplating my legs on the bicycle cranks while riding along a lonely road in the middle of the night." Henry Ford traved his first interest in automobiles to 1875, when he saw a steam engine used for powering sawmills and threshing machines on which a chain had been run from the engine to the rear wheels so that it could propel itself from job to job. At the age of sixty Ford wrote, "From the time I saw that road engine as a boy of twelve... my greatest interest has been in making machines that would travel the roads." The parts for Heny Ford's first car were assembled from junk yards and scrap piles. He fitted four bicycle wheel together with gas pipe hubs, made a two-cyclinder water-cooled engine from cast-off pipe, attached and old buggy seat and dashboard between the wheels, and fastened a gas tank under the seat. His first car had two forward speeds, one of ten and one of twenty miles per hour, with a lever to shift from low to high. There was no intermediate speed or reverse. Ford sold his first car for two hundred dollars before starting to build another.

Henry Ford's first Model T appeared in 1908, and he was to sell more than fifteen million "tin lizzies" before replacing his pride and joy with the Model A in 1927. Cheaper and better motor cars were made possible by the standardization of parts and the highly developed assembly

line. More than twenty million motor vehicles were sold by 1925, a hundred million by 1948, two hundred million by 1962, and nearly 350 million by 1975. Although it was European engineering genius that conceived the gasoline-powered automobile, it was American entrepreneurial genius that made it a financial success.

Trucks and buses during the same time period, expanding the commercial capabilities of the national railroad systems, also showed great numerical growth. Unlike the fixed operations of the railroad, trucks could go anywhere there was a road, and could quickly adapt their schedules to meet any need. There were only 700 trucks in 1904 and less than 350,000 before World War I. Bus transportation became firmly established by 1922, and in 1928 transcontinental service was available. In 1954 there were nearly ten million trucks and buses, and more than twenty-five million were registered in the U. S. in 1975. Alabama's share of trucks and buses in 1975 was over one-half million.

The numerical increases in motor vehicles were paralleled by like jumps in the number of allied auto institutions - the filling station, the tourist camp, and "roadside stands." The first filling station was operated by Gulf Oil Company in Pittsburg in 1913. Thee were 15,000 station by 1920; 317,000 in 1930; and 200,000 in 1950 (a drop due to fewer breakdowns and larger gas tanks which made fewer stops necessary). Tourist camps increased from 600 in 1922 to 14,000 in 1940. By 1930 there were 110,000 roadside stands. Many of these fruit and vegetable stands with refreshments for the weary motorists evolved into modern supermarkets.

The highway "motorscape" had similar auto-induced landscape changes within cities. There was a pronounced movement of city populations to the suburbs by 1919, a trend which has continued to the present, and the first suburban shopping center appeared by 1922. The auto-

related "motorscape" changes of today thus had an early beginning.

Roads and automobiles advanced side by side. With more autos came the demand for better roads, with better roads more people wanted automobiles, and so on. State highway systems totaled about 200,000 miles in 1920. In Alabama, there were slightly less than 4,000 miles on the state system. By 1940, Alabama had over 6,500 miles of state roads, and the total of all state systems were 329,000 miles. Good roads were becoming a reality and the "Automobile Revolution" provided the stimulus. The quality of highways also improved. By the 1920's the marking of highway was very common, with Federal highway numbers on a shield-shaped sign and state highway numbers on round signs. The markings, in turn, made road maps more useable.

Multiple inventions and innovations accompanied the "Automobile Revolution." For example: four-wheel brakes and lacquer finishes (reducing porduction painting from thirty-seven days to three hours) appeared in 1923; anti-knock Ethyl gasoline, high-compression engines, and balloon tires were available by 1924; safety glass was introduced in 1926, synchronized transmissions in 1928 independent front suspensions in 1934, automatic transmissions in 1938, and sealed-beam headlights in 1940; rubber was developed in World War II; tubeless tires were tested in 1947 and Goodrich put them on the market the next year; Cadillac launched the era of super-performance with the 160 horsepower V-8 in 1949; and Chrysler had an experimental turbine engine by 1956.

An Alabamian who contributed to the automobile-related inventions was Baldwin County native Miller Reese Hutchinson. Hutchinson attended Mobile public schools, Marion Military Institute, Spring Hill College, Auburn University and the Medical College of Alabama. He patented the "Klaxon" (automobile horn) and hearing aids for the deaf before becoming Thomas

Edison's chief engineer of the Edison Laboratories.

One temporary innovation in the 1920's was the "jitney" - a sort of half-bus, half-car - which functioned as a taxi for the people of the era. The jitney was used in Alabama and, in 1923, became the focal point of an urban transportation conflict in Birmingham. The "notorious jitney," according to competitive transportation sources, terrorized the streets of Birmingham in the "Roaring Twenties." As explained by Blaine A. Brownell in his 1972 article in Alabama Review, the jitney was an unusually large touring car which could accommodate five to seven paying passengers. It held fewer passengers than the more widely-used street railway of Birmingham, but it was more mobile (didn't have to follow the tracks), faster, and had about the same rates as the street car. Apparently it was also less safe, caused more accidents, and was less reliable in paying of claims resulting from accidents than the railed vehicle. By using the main thoroughfares the jitney also contributed to congestion in the downtown areas. Birmingham and Jefferson County had 310,054 inhabitants and about 16,000 motor vehicles in 1920 (about one vehicle for ever 19.4 people), but by the end of the 20's there were an estimated 70,000 vehicles (one per 6.6 persons). By modern standards this is not many automobiles, but, considering the concentration in downtown streets during rush hours and lack of today's traffic control methods, the private automobiles and the jitneys perhaps did contribute to congestion. More important, the jitney took away enough potential street car fares to arouse the local street car company - the Birmingham Railway Light and Power Company - to mobilize its political forces and influence the City Commissioners to effectively legislate the jitney out of business in 1923. In brief, the street car company reduced its rates from eight cents to seven cents, promised not to raise rates for three years, donated 175 street lights to the city without charge, reduced its price for additional street

lights to be purchased by the city, and paved a section of First Avenue. In exchange the city banned jitneys from the business district and all streets within two blocks of street car tracks, and required jitneys to have a special permit from the City Commission, pay an annual license fee of $100.00, and post a surety bond of $10,000. The Commission accepted the street car company's offer, the Birmingham voters sustained the action, and jitneys became a novelty of early Alabama and Birmingham automotive history.

Jitney travel may have been hazardous, but early automobiles also had their hazards and their share of accidents, whether due to the vehicles or the drivers. Northwest Alabama historian Carl Elliott related one such accident (which will be in his next book on Alabama history). Appropriately occurring on a May day in 1917, it involved two Jasper residents, the mayor and a well-known lawyer, returning from Birmingham to Jasper. Leaving the "Magic City" at ten o'clock to be home for lunch, they arrrived at the midway point near West Sayre at about eleven o'clock upon which the lawyer offered to relieve the mayor of the task of driving the remaining distance. At this time, "then and there" the mayor

> stood straight up on the floor board of the front seat, all the while gripping the car's steering wheel so as to allow his friend to slide under him into the driver's seat...while the maneuver of swapping drivers without stopping the car was underway...(the mayor somehow list control of the car...(He) attempted to resume the driver's normal position and made a desperate effort...(but) the car slowed down, and for one full second stood absolutely still. Then it started, slowly at first, to roll over and over down the high embankment. When it reached the bottom of the hill, the car stood upright again.

Doctors summoned from Sayre and Jasper dispatched the victims to the Birmingham Hospital. The mayor had a broken collar bone and head cut and the lawyer had a deep chest bruise. Apparently their many friends were so overjoyed to see them well that no one asked why they didn't stop the car before they attempted to change seats. It was fortunate that automobile

sppeds were as low as they were in 1917.

All the while, automobile speeds continued accelerating. A gasoline-powered auto made thirteen miles per hour in the first automobile race held in France in 1894, and a like vehicle averaged fourteen miles per hour in a 744 mile Paris-Bordeaux race the next year. The French continued to hold the world speed records with a 39.24MPH clocking in 1898, 65 MPH (in an electric auto) in 1899, 75 MPH (steam-driver vehicle) in 1902, and 125MPH (steam auto) in 1906. Of course, these early speeds seem primitive in light of the 299 MPH speed of Major Campbell's "Blue Bird" racing automobile at Salt Lake City in 1935 or the 391 MPH recorded by United States racing driver John Cobb twelve years later.

Today's "double nickel" speed limits enforced by the "Smokey Bears" had antecedents in the early "Automobile Revolution" era. New York issued drivers' licenses (Engineer's Certificates) in 1900. Connecticut enacted a motor-vehicle law in 1901, and the same year New York initiated motor registrations (totaling $954.00 in receipts). White lines appeared on streets in Readlands, California, in 1912. In 1914, Detroit introduced the stop sign and Cleveland developed the first traffic light. Parking meters were used first in Oklahoma City in 1935.

Why was the automobile widely endorsed by individuals instead of being merely another group-ridden conveyance such as the steamboat or the railroad passenger coach? The fundamental reason that the American manufacturers recognized the laborer was a consumer as well as a producer of American goods, and marshalled mass production and assembly line methods to produce an automobile within the ordinary citizens' ability to purchase. Average retail prices of automobiles in the United States decreased from $1,559 in 1899 to a low of $828 in 1929 before increasing the $845 in 1939 and $1,580 in 1947. (The 1909 price was $1,719 and

the 1919 price as $1,157.) As to the higher prices in the later years, the Automobile Manufacturers Association appropriately noted in 1948 that "if one combines markedly higher quality of the present day automobile with the decline in the purchasing power of the dollar, it is clear that today's car owner is paying considerably less for what he gets than his predecessor did." In addition, the average price does not reflect the availability of a new car to the common citizen, e.g., the most sold in the 1920's was the Ford Model T which could be purchased in 1926 for on $290.

A second factor which contributed to broad-based auto ownership was the development of installment buying. Ford used a subsidiary, the Universal Credit Corporation, and General Motors its Acceptance Corporation for the credit function. Other manufacturers engaged private companies such as Commercial Credit or Commercial Investors Trust and banks for financing their automobiles. As a result of the credit evolution, three-fourths of all motor vehicle sales in 1926, new and used, were made on time-payment plans, and the method proved so popular that it spread to other durable goods sales.

No less a factor in the popularization of the auto, and particularly its technological evolution, was the American entrepreneur who put it all together - resources, inventions, and labor - and made things happen. Whether "Robber Baron" or "Captain of Industry," he spearheaded American Industrilization and the Automobile Revolution. J. Frank and Charles E. Duryea followed their horseless carriage which made the successful trial run in Springfield, Massachusetts, in 1893 with a second, and more improved, vehicle which was the model for thirteen cars produced by the Duryea Motor Wagon Company in 1895-1896. Meanwhile, Elwood G. Haynes of Kokomo, Indiana, opeated a similar vehicle in 1894 and Stephen M. Balzer

of New York brought out the third U. S. auto later in the same year. By 1895 several autos were on the market and included: the Electric Wagon; Electrobat; Hall's Gasoline Trap' Hertel; Hill's Locomotor; Howard-Gasoline Wagon; J. B. West's Gasoline Vehicle; and the Morris and Salom Electric Wagon.

The two stalwarts of early automobile manufacturing, however, were Ransom E. Olds and Henry Ford. Olds, like Ford, built a steamvehicle before a gasoline-driven one. His first gasoline-driven model was a failure, but the second Oldsmobile, in 1897, proved a tremendous success. The 1897 vehicle carried four passengers, and its ten MPH spped was the fastest around. Olds was the first auto manufacturer to demonstrate the possibility of a mass market for a low-priced car. Ford produced a homemade car in 1896 for his employer, the Detroit Electric Company, and had two auto companies fail before launching the Ford Motor Company in 1903 with $28,000 solicited from thirteen different investors. Ford is chiefly known for his willingness to do the unorthodox and assume the risks necessary to make a mass-produced low-cost car a reality.

For a time the steamers were the automobile rage, and the Olds and Ford appeared unwise for switching to the gasoline models. The Stanley Steamer, built by the Stanley twins, F. E. And F. O., was the fastest and was said to have reached 180 MPH in a 1907 run at Daytona Beach by famous race driver Fred Mariott before hitting a rough spot in the sand and cracking up. Two hundred Stanley Steamers were sold in 1898 following F. O. Stanley's world record for the mile (two minutes and seventeen seconds), but, despite the advantages of being faster and quieter than the gasoline-buring engines and their ability to use almost any kind of cheap gas or oil, they had to have an extensive warm-up period prior to operation and the boiler, burner, and operating parts had to be cleaned each week. The operation delay and maintenance requirement eventually

doomed the steamers in competition with the gasoline driver vehicles.

The most successful of the early gasoline autos ws Henry Ford's Model T. It was cheap ($800 initially but less than $300 by 1920-1921), simply designed for almost anyone to repair it, and specifically designed to meet the farmer's needs, i.e., it was high enough off the ground to travel over deep ruts and fair-sized rocks and stumps, and it was light enough to run through swamp, sand, and mud. Ford loved his Model T and gave it up for the Model A in 1927 only because of the competition of the General Motors' Chevrolet which, unlike the Model T, did not have the buggy look.

Whether a Ford, Oldsmobile, or some other forerunner such as the Chevrolet, the early automobiles required considerable publicity prior to acceptance by the American public. An early promotion device was the cross-country automobile trip. Alexander Winton's 800-mile journey from Cleveland to New York in 1897 was the first long overland trip by auto, but it was soon followed by the first transcontinental crossing by auto in 1903 by Colonel H. Nelson Jackson in a two-cyclinder chain-driven Winton. Jackson completed the excursion in sixty-three days.

Early motorists, particularly the cross-country pioneers, were normally mechanics, and had to be to keep the vehicles operating. Early vehicles on the market included tool kits with assorted wrenches, pliers, hammers, pins, nuts, bolts, a hacksaw, wrecking bar, file, blowtorch, solder and flux, oil cans, gloves, overalls and soap. Casual motoring was, in addition, a fair weather activity because of the bad roads, and, before the 1920's, approximately ninety percent of all automobiles were either open or touring models. For the same reason, even in good weather, a liner duster was worn to protect passengers from the dusty roads.

Auto breakdowns and sensational publicity led to many jokes and the "get a horse"

admonition to a stalled motorist was common. Former Alabama Roadbuilder editor Ed Rodgers collected the following anecdotes of this type. An early Buick ad read: "Built to Run and Does It." A dissatisfied customer cut out the ad and mailed it to the company with a slight change: "Built to Run and Does It?" Roy Chapin boasted that the Oldsmobile required "Nothing to Watch But the Road" until receiving a letter from an owner stating that he was tired of watching the same stretch of road. One widely advertised low cost car, the Bush car by inventor A. P. Bush, had wooden wheels, a wooden axle, and a wooden frame, but a skeptic also noted that it "wooden run."

In the end the skeptics were silenced and the entrepreneurs proved the worth of the new transportation device. Besides Olds and Ford, other entrepreneurs of note and their contributions were: William C. Durant and Alfred P. Sloan of General Motors who developed the concept of industrial organization which made General Motors the leading company and furnished the model for other manufacturers to follow; Walter Chrysler who took an insolvent company and made it one of the Big Three; Roy Chapin for his foresight in connecting road improvement and auto sales and his post-Olds-mobile entrepreneuring effort with the Hudson Motor Car Company; and Howard Coffin for making technical stadardization effective. MIT's John Rae, in American Automobile Manufaturers: The First Forty Years, synthesized the composited the composite traits of the automobile entrepreneurs and determined that they: 1) were at least middleclass; 2) had some technical training or experience (often college trained engineers but outnumbered by machinists and mechanics); 3) could balance the claims of design, production, finance, and marketing into a smooth-working combination; and 4) had a passionated devotion to the making to motor vehicles (over and above mere money-making). Regardless of their common

characteristics, they were the leaders of the "Automobile Revolution" and initiated its many modifications of American society.

In short, the automobile has transformed American society. By reducing sectionalism, it Americanized the country. By bringing farmers to the city and city-dwellers to the farm, it homogenized theUnited States. It caused cities to expand into suburbs, and , through shopping centers (mini-cities) and thoroughfares, it made the suburbs more city-like. Superhighways, motels, drive-ins, parking areas, service stations, and garages have "automobilized" the American landscape. As noted by historian Daniel Boorstin, the story of the automobile:

> touches nearly every aspect of the American economy and of American culture in this century... the whole American economy has been crucially involved with the automobile. It is the story of booms and depressions, of therise of industrial unionism, and of the national effort in two world wars. We cannot understand what we mean in America by competition or by monopoly, by advertising, by industrial leadership, or by know-how unless we have understood the role of the automobile. It touches the most intimate regions of our life - courting practices and the family and a man's feeling about his place in the social scale - and the most public ... The automobile, then, has long ceased to be only an instrument of technology and has become a characteristic Amreican institution.